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ABSTRACT

This report contains a brief summary of the statewide findings of the 1974 Delaware Educational Assessment Program (DEAP). A number of reports and publications, prepared by the Department of Public Instruction, provide detailed analyses of the data. The body of this report gives a short description of the program, some comparisons of the performance of Delaware students to the performance of a national norming sample, an analysis of those tasks or objectives that Delaware students have mastered and those on which performance was less than satisfactory, and a very brief list of the implications of the data for Delaware. (Author)

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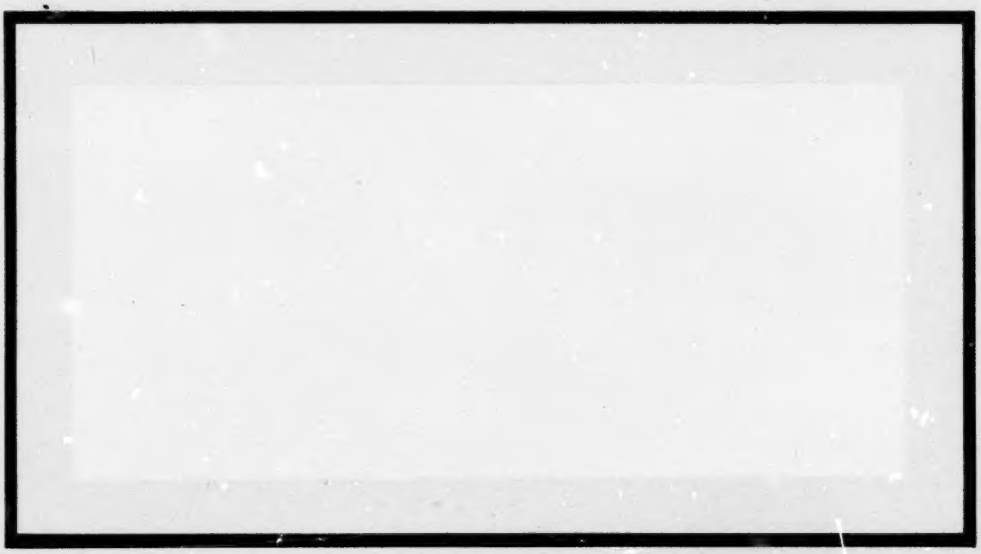

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SUMMARY REPORT

1974 DELAWARE EDUCATIONAL ASSESSMENT PROGRAM

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INTRODUCTION

This report contains a brief summary of the statewide findings of the 1974 Delaware Educational Assessment Program (DEAP). A number of reports and publications, prepared by the Department of Public Instruction, provide detailed analyses of the data. The body of this report gives a short description of the program, some comparisons of the performance of Delaware students to the performance of a national norming sample, an analysis of those tasks or objectives that Delaware students have mastered and those on which performance was less than satisfactory, and a very brief list of the implications of the data for Delaware.

HIGHLIGHTS

The strengths and weaknesses of the Delaware educational program are highlighted in the following paragraphs, which are based on an analysis of the results of the 1974 Delaware Educational Assessment Program. That program and the procedures used to determine these strengths and weaknesses are described more fully in the body of this report.

* First-grade students performed better than the national average in the three general areas tested: reading, listening, and mathematics. Within those areas, there were no specific fields in which their performance was below that of the national group. They scored considerably higher than the national group in the following fields:

  Reading. The identification of beginning and ending sounds of words pronounced by the teacher.

  Listening. The ability to use words to describe pictures or actions.

  Mathematics. The ability to add and subtract single digit numbers and to recognize that the order of adding numbers does not effect the answer.

* Fourth-grade students performed about on a par with the national group in the four general areas tested: reading, English, mathematics, and science. In science, some of the *National Assessment* test questions were used, and on those questions, Delaware fourth-graders did less well than the national group. Within the areas tested, the following strengths and weaknesses are apparent.

  Reading. Performance in the specific fields of reading was uniformly about equal to that of the national group.

  English. The strongest field was the ability to identify the most appropriate forms of expression in written language. The field of greatest weakness was spelling.

Mathematics. The strongest field was the addition and subtraction of whole numbers. Two fields showed equally poor performance: the division of whole numbers and the conversion of a simple measure from one unit to another within the same system (e.g., converting a given number of days to weeks and days).

Science. In reference to the national group, the strongest field involved the use of the metric system, and the weakest was the use of the qualities of an object to describe it, and, thereby, distinguish it from similar ones. In reference to the *National Assessment* group, the greatest strength was in the ability to describe the relationship of variables in an investigation, the greatest weakness was in the ability to identify and name the variables related to an investigation.

* Eighth-grade students did less well than the national average in the four areas tested: reading, English, mathematics, and science. The one exception involved *National Assessment* science questions on which Delaware's eighth-graders performed as well as the national average. Within the areas tested, the following strengths and weaknesses were shown.

  Reading. The strongest field was the ability to point out that part of a composition that implies a cause and effect relationship. The weakest fields were synonyms and the ability to recognize the meaning of a word from the context in which it appears.

  English. The strongest field was spelling; the weakest, capitalization and punctuation.

  Mathematics. The strongest field was the ability to find the average and the midpoint of a set of data; the weakest, the ability to use proportions to solve problems.

  Science. In reference to the national group, the strongest field was the ability to pick out relevant information and to construct a graph using it. The weakest field was the ability to distinguish between physical and chemical changes. There were not enough questions in any field to identify strengths and weaknesses in reference to the *National Assessment* group.

DESCRIPTION OF THE PROGRAM

The Delaware Educational Assessment Program (DEAP) is part of a plan for educational program improvement. A short description of this plan, the Delaware Educational Accountability System (DEAS), is presented

here to place the assessment program in its proper perspective. This is followed by a description of the 1974 assessment program itself.

Description of DEAS

DEAS is a comprehensive, long-range plan developed to improve education in Delaware's public schools through the cooperative efforts of the Department of Public Instruction and the local school districts. Its purpose is to provide answers to the following questions:

* What do we want from our educational system?
* What have we attained?
* What are our program strengths and weaknesses?
* What can be done to improve educational programs?

The first question was partially answered by the adoption of statewide educational goals by the State Board of Education in 1972. Since that time, these goals have been refined through the development of statewide objectives in the basic skill areas of reading, language arts, mathematics, and science in grades one, four, and eight. Objectives are also being developed for health and for social studies. Current plans call for the future development of objectives for grade twelve and for the remaining goal areas adopted by the State Board. When these tasks have been completed, Delaware should have a reasonably complete response to the first question.

The assessment program is primarily concerned with the second and third questions. DEAP provides for the annual collection, analysis, and interpretation of data on student performance and on school and community characteristics. As the data are analyzed and interpreted, at least partial answers can be given to questions concerning the current status of education in Delaware and the relative strengths and weaknesses of various educational programs.

It is hoped that the analyses and interpretations of the assessment data will lead to program modifications and improvements, the primary purpose of the DEAS plan. This last step is the responsibility of local school personnel, but can probably be best accomplished by using Department of Public Instruction staff in a resource role. (Small financial grants have been provided to the districts in the past two years to aid in this effort.)

Description of DEAP (1974)

The 1974 assessment program involved the collection and analyses of data relating to school and community characteristics and to student performance. Data on twenty six school and community resource variables were collected on 151 schools and 23 school districts. The student performance data were obtained from DEAP test batteries, which were administered to all students (approximately 27,500) in grades one, four, and

eight in 151 schools in all 23 regular school districts in the state.[1] In addition, about 1,050 grade one students in Delaware's nonpublic schools were tested. The 1974 assessment program was designed to provide the following types of information to be used in planning improvements in educational programs.

* The academic achievement level of each participating student.
* The ability and achievement levels of students in each school, each district, and in the state as a whole.
* The degree of relationship between student performance and selected school and community characteristics.

School and Community Data - Data on the characteristics of the schools and communities they serve were collected from Department of Public Instruction records, census reports, and principals' questionnaires. The data collected dealt with: education level of parents, housing characteristics, parents' occupations, district wealth and effort, educational revenues and expenditures, staff training and salaries, and attendance and dropout rates of pupils.

Test Batteries - The achievement tests in each of the assessment batteries are based upon published, nationally-normed tests. Each of these tests was changed, however, to make them better suited as measures of the achievement of Delaware's educational objectives. The questions included in each test in each battery were selected by committees composed of personnel from Educational Testing Service, the Department of Public Instruction, and the local school districts.

The first grade assessment battery, which was administered to about 8,500 public school students, was composed of achievement tests in reading, listening, and mathematics and yielded four scores for each student, one on each test, plus a composite. The tests are based on the *Cooperative Primary Tests*.

The assessment batteries for grades four and eight, which were administered to about 9,400 and 9,600 public school students, respectively, are composed of ability tests and achievement tests in reading, English, mathematics, science, and social studies. Although similar at the two grade levels, they contain different items to reflect the differences in age and grade placement. The aptitude tests are the published form of the *School College Ability Test* appropriate for the grade level being tested. The majority of the items on the achievement tests in reading, English, and mathematics are taken from the various forms of the *Sequential Tests of Educational Progress (STEP)*. The science tests are primarily constructed from *STEP* and *National Assessment* items. The social studies test, written specifically for Delaware, contained no items with appropriate national statistics.

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[1]The testing of all students in each of the grade levels involved is an unusual feature of the Delaware program. The majority of assessment programs test only a fraction of the students enrolled at specific grade levels.

Reporting of Results - About twenty different kinds of computer generated statistical reports were prepared from the data collected in the 1974 assessment program. These reports provided information on each student, school, and district, and on the state as a whole. It is in the reporting phase that DEAP differs most from the standard testing and analysis services available from commercial test publishers. All the reports prepared are "tailor-made" to meet our specifications.

These reports provide both norm-referenced and objective-referenced information. That is, some reports permit comparisons to be made from student-to-student, school-to-school, or district-to-district. Other reports permit schools, districts, and the state to compare the performance of students on certain tasks (objectives) with their performance on other tasks. For example, a school can determine the performance of its students on the mathematics test compared to the students in all schools in the state (norm-referenced); they can also determine, among the several topics covered by the mathematics test, those topics or objectives on which their students did most well and least well (objective-referenced). The school may find that its average mathematics score is better than the average score in 75 percent of the schools in the state, however, the reports might also indicate that only 45 percent of the students in the school could add and subtract simple fractions.

Still other reports provide information about the performance of students relative to the characteristics of the school they attend or the community in which they live. This latter group of reports permits schools and districts to compare the performance of their students with the performance of students in schools serving a similar population.

STATEWIDE RESULTS

This section of the report first provides a series of comparisons of Delaware's performance to the performance of a national norming group. This is followed by a more in-depth analysis of student performance on specific objectives.

Delaware in Comparison to the Nation

As indicated previously, the tests used in the assessment program, with the exception of the grade four and eight ability tests, were modified specifically for Delaware. Thus, comparisons of Delaware and national data cannot be made using information from the total test; however, some comparisons can be made by using item statistics.

Grade 1. Comparisons between the performance of Delaware's grade-one students and those in the national sample are given in Table 1. The table was constructed by adding together the percentage of correct responses to those items on which national statistics are available and then dividing by the number of items. An example of the interpretation of the resulting number follows. The mean percent correct responses on the listening test in 1974 was 77.6 percent for Delaware students. The 77.6 percent means that the average first-grader correctly answered about 78 percent of the 41 common items.

Table 1 indicates that Delaware first-graders exceeded the national norms on all tests in the battery. Differences ranged from +3.9 percent on the reading test to +5.5 percent on the mathematics test.

Grade 4. Comparisons between the performance of Delaware's fourth-grade students and those in the national sample are provided in Table 2. The table was constructed using a procedure identical to that used for the first-grade table. Because the science items were drawn from *STEP* and *National Assessment* and thus were normed on two different national samples, two separate comparisons are provided for science.

Table 2 indicates that Delaware's fourth-grade students performed less well on the ability tests than did the national norming group. The two groups performed about equally well on most of the achievement tests. The difference on the ability test was -4.4 percent while the differences on the achievement tests ranged from -0.8 percent on reading to -6.2 percent on those science items drawn from national assessment.

Grade 8. Comparisons between the performance of Delaware's eighth-graders and those in the national norm groups are given in Table 3. The table was constructed in the same way as Table 1, described above. As with grade four, the results for the science items drawn from *STEP* and from *National Assessment* are shown separately.

The data in Table 3 indicate that Delaware's eighth-grade students did less well on all of the tests than did the national norming sample except for the thirteen science items drawn from *National Assessment*. On those items Delaware's students matched the national statistics. Delaware eighth-graders gave about four percent fewer correct responses on the ability test and, except for the *National Assessment* science items, gave seven to eight percent fewer correct answers to the items on the achievement tests.

TABLE 1

COMPARISON OF DELAWARE AND THE NATION
GRADE ONE
1974 DEAP

Test	Number of Items on Test	Number with National Norms	Mean Percent Correct Response		
			Delaware	Nation	Difference
Listening	50	41	77.6	73.1	+ 4.5
Reading	50	50	71.0	67.1	+ 3.9
Mathematics	55	38	72.6	67.1	+ 5.5

TABLE 2

COMPARISON OF DELAWARE AND THE NATION
GRADE FOUR
1974 DEAP

Test	Number of Items on Test	Number with National Norms	Mean Percent Correct Response		
			Delaware	Nation	Difference
Verbal Ability	50	50	47.3	51.0	- 3.7
Quantitative Ability	50	50	53.7	58.8	- 5.1
Total Ability	100	100	50.5	54.9	- 4.4
Reading	60	22	62.3	63.1	- 0.8
English	100	78	60.4	63.6	- 3.2
Mathematics	75	52	60.9	63.0	- 2.1
Science	50	46			
STEP		22	50.2	52.9	- 2.7
National Assessment		24	50.1	56.3	- 6.2

TABLE 3

COMPARISON OF DELAWARE AND THE NATION
GRADE EIGHT
1974 DEAP

Test	Number of Items on Test	Number with National Norms	Mean Percent Correct Response		
			Delaware	Nation	Difference
Verbal Ability	50	50	60.2	66.8	- 6.6
Quantitative Ability	50	50	57.1	58.2	- 1.1
Total Ability	100	100	58.7	62.5	- 3.8
Reading	60	43	56.6	63.6	- 7.0
English	100	77	56.9	64.5	- 7.6
Mathematics	75	59	57.2	64.7	- 7.5
Science	50	45			
STEP		32	55.6	62.9	- 7.3
National Assessment		13	58.1	58.2	- 0.1

Student Performance Related to Objectives

In addition to the summary data presented previously, information is available on the percentage of students in Delaware who correctly answered each question on each test; similar data on a national sample of students are also available on many of the items in the battery. The test items within a general subject area (i.e., mathematics, reading) can then be classified into clusters or groups of items which measure more specific skills or tasks. The statewide educational objectives are a convenient and meaningful basis to use in performing this classification and were used in preparing the analysis which follows.

For each general subject area tested, the items were classified according to content area. The percentages of Delaware students correctly answering each item were summed across all items in the cluster and an average percent correct was computed. A similar procedure was employed to obtain the average percent of correct responses for the national sample, and then the difference between the national and state percentages was computed. Though the above computations were prepared for every cluster of items, the following narrative description is limited to those clusters of items relating to statewide objectives where at least three nationally-normed items were administered.

Grade 1. First-grade students performed better than the national average in the three general subject areas tested: reading, listening, and mathematics, and there were no specific skills or tasks within these general areas where their performance was below that of the national group. The detailed analysis based on the statewide objectives leads to the following:

Reading. The best performance of Delaware first-graders on the reading test was noted on those items dealing with beginning and ending sounds of words. On these items Delaware students gave 7.1 percent and 8.3 percent more correct responses than the national group. They also did quite well on items dealing with choosing the implied meaning of a story they had read (+5.5 percent compared to the national group) and with rhyming words (+4.8 percent). The poorest performance on the reading test was noted on the cluster of items that required students to identify basic sight words; Delaware students gave 1.2 percent more correct responses than the national norming group.

Listening. When the items were classified as to content or skill required for completion, the performance was fairly uniform across the entire test. However, Delaware students performed best on those items that required them to describe pictures or actions using one or two words (+6.4 percent compared to the national group). They did least well on that cluster of items requiring them to maintain a series of events in retelling a story (+1.6 percent compared to the national group).

Mathematics. Because the mathematics test covered a large number of statewide objectives, the items were classified as to category or strand for ease in discussing the results. Delaware first-graders did best on the cluster of items that dealt with mathematical operations and properties of numbers. Most of these items dealt with addition and subtraction of whole numbers and Delaware students gave 8.5 percent more correct answers than the national group. The poorest performance on the mathematics test was noted on those items dealing with sets, numbers, and numerals. Most of the items in this cluster dealt with counting and Delaware's students gave only 1.7 percent more correct answers than the national group.

Grade 4. Delaware's fourth-grade students, with one exception, performed about on a par with the national average across the general subject areas tested: reading, English, mathematics, and science. They performed below national norms on those items in the science test that were drawn from the *National Assessment*. An analysis of the results based on statewide objectives leads to the following:

Reading. The results on the reading test, in total, were about equal to the performance of the national group. Furthermore, there were no outstanding differences in performance on clusters of items within the test, i.e., performance on all clusters of items relating to the various statewide objectives was very uniform.

English. The performance of Delaware's fourth-graders in comparison to the national group on the English test was "borderline" in that Delaware students gave about 3.2 percent fewer correct responses on the entire test than did the national group. Unsatisfactory performance was noted on the cluster of items that dealt with spelling (-4.7 percent compared to the national group), capitalization and punctuation (-4.4 percent compared to the national group), and proofreading (-4.3 percent compared to the national group). The best performance on the English test occurred on the cluster of items that required students to select the proper forms of words in sentences (usage); on this cluster of items Delaware students were only 1.9 percent below the national group.

Mathematics. Though the performance of Delaware fourth-graders was about on a par with the national group on the entire test, there were substantial differences in their performance on various clusters of items. The best performance was noted on the cluster of items that required the students to solve simple open sentences, "simple equations". On this cluster of items, Delaware students gave about 1.2 percent more correct answers than the national group. At the other extreme were the clusters of items that dealt with division of whole numbers and with the conversion of a measurement in one unit to a measurement in another unit in the same system, e.g., inches to feet or minutes to hours. In these latter two clusters, Delaware

students gave 8.3 and 7.5 percent fewer correct answers than the national group, respectively.

Science. The Delaware fourth-graders performed about on a par with the national group on those items that were drawn from the *Sequential Tests of Educational Progress*. However, their performance compared to the national group on those items drawn from *National Assessment* was very unsatisfactory. The best performance was noted on the cluster of items that required the students to describe the relationship between variables in an investigation. On this cluster, Delaware students gave about 4.7 more correct answers than the national group. On the other hand they performed very poorly on those items that simply required them to identify the variables related to an investigation; Delaware students gave 9.0 percent fewer correct answers on this cluster than the national group. Unsatisfactory performance also occurred on a cluster of items that required the student to describe an object in such a way that it could easily be identified in a collection of similar objects (-5.0 percent compared to the national group).

Grade 8. Delaware eighth-graders performed less well than the national average in all of the general subject areas tested: reading, English, mathematics, and science. However, on the group of science items that were taken from *National Assessment*, the performance of Delaware students was about on a par with the national group. An analysis of the results based on the statewide objectives leads to the following:

Reading. The performance on the total test was below that of the national group; furthermore, Delaware students did not exceed the performance of the national group on any specific cluster of items. The poorest performance on the test occurred on a cluster of vocabulary items that required the students to supply a synonym for a given word or to recognize the meaning of a word from the context in which it was used. On this cluster of items, Delaware students gave 10.0 percent fewer correct responses than did the national group. Delaware students also performed poorly on a cluster of items that required them to identify the correct conclusion after having read a selection (-7.0 percent compared to the national group). The only cluster of items on which Delaware students approximated the performance of the national group was on a cluster requiring the students to identify the portion of a written passage that inferred a cause and effect relationship (-1.0 percent).

English. Delaware eighth-graders performed well below the national group on the total test. Furthermore, the performance was fairly uniform across the cluster of items dealing with the various objectives. The poorest performance on the test was noted on the cluster of items that dealt with capitalization and punctuation. Delaware students gave about 9.5 percent fewer correct answers on this cluster than did the national

group. On the remaining objectives the Delaware students gave from 6.3 percent to 7.5 percent fewer correct responses than did the national group.

Mathematics. Delaware eighth-grade students performed far below the national average on the total mathematics test. The worst performance was noted on a cluster of items that required the students to use proportions in solving problems; on this cluster, Delaware students gave 11.2 percent fewer correct answers than the national group. Their performance on the cluster of items dealing with operations on whole numbers (addition, subtraction, multiplication, and division) was also far below the national group (-10.3 percent). Delaware students also had difficulty with the measurement items (-9.6 percent compared to the national group) and with the cluster of items dealing with numeration (-9.0 percent compared to the national group). Delaware students did the best, compared to the national group, on a cluster of items that required them to compute the mean (average) and median for a given set of numbers. On this cluster, even though the performance was better than on most other clusters, Delaware's students gave 5.7 percent fewer correct responses than the national group.

Science. The Delaware eighth grade students performed about on a par with the national group on those items taken from *National Assessment*. However, their performance compared to the national group on those items taken from the *Sequential Tests of Educational Progress* was unsatisfactory. They had the most difficulty with the cluster of items that required them to distinguish between physical and chemical changes (-9.2 percent compared to the national group) and with those items that required them to distinguish between elements, compounds, and mixtures (-8.3 percent compared to the national group). The best performance, about on a par with the national group, was noted on those items that required the students to interpret tables and graphs. On this cluster, Delaware students gave only 1.8 percent fewer correct responses than their counterparts in the nation.

IMPLICATIONS

In view of the weaknesses revealed by analysis of the 1974 data and supported by similar findings in 1972 and 1973, it seems reasonable to suggest the following courses of action in attempting to improve instruction in Delaware's schools.

* An "in depth" study of the middle schools and junior high schools should be undertaken since the data for the past three years indicate that Delaware's eighth-grade students are performing substantially below national norms.

* Increased allocation of discretionary funds, such as Title I and Title III, should be made in the specific categories in which deficiencies have been noted.

* Local districts should perform local needs assessments, based on DEAP data, to determine their specific deficiencies. Instructional and Planning, Research, and Evaluation staff of the Department of Public Instruction should increase their efforts in providing leadership and technical assistance to schools in areas of needs assessment and corrective action planning.

* Funding at the state level should be considered in order to provide support for DEAS and DEAP activities.

* Consideration should also be given to compensatory funding for schools or districts in which student achievement in need areas is very low.